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Statistical Report of Survey of Southern Oregon-Northern California Pine Beetle Control Project During Season 1926

Statistical Report #5.

By
F. P. Keen
Associate Entomologist.

April 1, 1927

STATISTICAL REPORT OF SURVEY

ON

SOUTHERN OREGON - NORTHERN CALIFORNIA

PINE BEETLE CONTROL PROJECT

DURING

SEASON 1926

STATISTICAL REPORT NO. 5

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U. S. Bureau of Entomology

Box 3010
Stanford University, California
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Introduction

Every year since 1921 a survey has been made of the area included within the Southern Oregon-Northern California Pine Beetle Control Project, to determine the progress of the infestation and the extent and amount of the beetle damage and the results of control operations.

During the fall of 1925, Mr. Buckhorn and the writer made a preliminary cruise of some of the important check sections of Areas 1 and 2, and in the spring of 1926 a three-man crew, consisting of Mr. W.J.Buckhorn, Mr. R.A. Miller and the writer, made an intensive survey of the check sections on Area 3 and a portion of Area 2. From these data an estimate was made of the total beetle loss on the project area during 1925. Due to the limited funds available for this work, only a small percentage of the large area involved in this project would be intensively cruised, and therefore the accuracy of the estimate is less reliable than in previous years. The data secured from the check sections, however, were taken in the same manner as in previous seasons, and are therefore entirely comparable.

This report covers in a brief way the results of the sixth annual survey of the project area, and gives in tabulated form the loss figures for the year 1925.

The Survey

In the fall survey ten chain strips were run by compass and pacing through the check sections and the trees blazed and counted, but not marked or tallied as to diameters. The figures secured in this manner are tabulated in Table 1.

In the spring work a three-man crew was used, and the check sections were cruised 100% by the usual, strip method of spotting. Increment cores were taken from 20 pairs of green and killed trees of equal diameter on each section, and in addition ten long cores were taken from selected trees in each regionto show the effect of climatic influences. The cruising data secured in the spring work are given in Tables 2 and 3.

During these two periods of work a 100% cruise was made of 14,600 acres, representing 1.15% of the project area.

The cost of the work was as follows:

Fall Survey 1925 - Oct.26-Nov.13, 1925 - 36 man-days
Salaries - $212.50
Expenses - 104.88 Cost per man-day $8.80

Spring Survey 1926--May 6-July 6, 1926 -180 man-days
Salaries of 3 men-$990.00
Expenses - - - - - 390.83
$1380.83 Cost per man-day $7.67

Total cost of surveys - $1698.21
Cost per acre cruised - $ .116

The Survey Data

The Insects

The western pine beetle is still the predominantly destructive pine beetle in this region. However, on the Sycon check section, out of 585 trees killed in 1925 the causes of death were as follows:

Dendroctonus brevicomis	79.5%
Dendroctonus monticolae	15.2%
Melanophila gentilis	1.9%
Ips emarginatus	1.3%
Unknown	2.1%
	100.0%

The Past Losses

When the surveys started in 1921 it was found that the infestation in this region had reached a peak in 1918 and was on the down grade. Comparing the percentage of stand killed for the past eight years we find that the following fluctuations have occurred:

Year	Per cent of stand killed	
1918	2.0%	estimated
1919	1.5%	"
1920	.97%	cruised
1921	.94%	"
1922	.82%	"
1923	.58%	"
1924	1.01%	"
1925	1.98%	"

Thus, starting with a 2.0% loss in 1918, the infestation gradually declined to a low point in 1923, when only .58% of the stand was killed. Then with the advent of the dry seasons of 1923 and 1924 the loss of 1924 nearly doubled that of 1923. The 1925 loss nearly doubled that of 1924, and indications in the fall of 1926 pointed to a further increase in the number of trees killed during that year.

The Present Insect Losses

In general, the loss of yellow pine timber through beetle attack during 1925 is the heaviest of which we have any reliable record.

The fall survey showed the 1925 loss to be 2.15 times as great as that of 1924. The spring survey, made after the trees had all faded, showed the 1925 loss to be 2.69 times as great as the 1924 loss on Area 2, and 2.88 times as great on Area 3. In other words, the 1925 increase in loss was from 115% to 188%.

Tables 4, 5, 6 and 7 show the total loss by units, areas, and for the project as a whole. It will be noted that the loss for the entire project area averaged 1.98% of the stand, which amounted to a total loss of 252,880,000 board feet, conservatively valued at more than a million dollars.

The 1926 loss will probably be greater than that of 1925, if preliminary indications are borne out in the survey of 1927.

What the 1927 loss will be is still problematical; but in view of the very favorable moisture conditions during the winter of 1926-27, it is expected that the tree resistance will be improved and that the beetle loss will materially decline.

Results of Control

During the fall of 1924, control work was carried out on the Clover Station Unit of Area 1, the Sycon Unit of Area 2 and the Deming Creek Unit of Area 3. The check on the losses of 1925 shows the results of this work.

As noted in Table 1, the fall survey showed that the increase on the untreated sections was 115%, while on the treated sections the loss was held practically constant, with an increase of only 12%. On Area 2 the spring survey showed an increase of 169% on the untreated sections and of 96% on the treated sections. This work would have shown better results had it not been complicated by a heavy defoliation of the Pandora moth and a light pumice soil, which furnished so little moisture to the trees in 1925 that many of them died from the effects of drought and defoliation and showed no, or very little, evidence of barkbeetle attack. Just south of this treated section the infestation of the untreated portion of the Sycon Unit showed a loss on 80 acres averaging 1510 killed trees per section.

On Area 3 the check section on the Deming Creek Unit was so thoroughly treated in the fall of 1924 that the survey crew during the following summer could find only five trees that had possibly carried overwintering beetles and had been missed in the treatment. This thorough work showed very definite results the following year, and although the infestation on surrounding untreated areas increased 188%, a reduction of 62% in the infestation on the treated section was secured.

In general, much more positive results have been secured from control work done in the face of an increasing infestation than during a period of natural decline.

Recommendations

Future Control Work

The policy of the Bureau of Entomology in regard to further control work on the Southern Oregon project has been very fully covered in "Control Plan Report #5" of January 24, 1926. In brief, our recommendations are that wherever timber values warrant the cost of protection from barkbeetles, control should be planned and financed on the basis of doing work every year, and that the actual operations should be carried out whenever it appears that an increase in barkbeetle losses can be prevented or an epidemic reduced. The Bureau feels that sporadic work, based on the findings of surveys made the previous year, is decidedly unsatisfactory; too much timber can be destroyed before the work can be organized, and by the time it is started Nature has often applied her own remedies.

The plan of attempting to control barkbeetle epidemics on the basis of a survey made one year before is as bad as attempting to control last year's forest fires with a crew of men starting their fire lines this year. The forest protective organizations, federal, state and private, must be prepared at all times to meet barkbeetle, as they now meet fire, emergencies.

Studies to be Conducted

The surveys which have been made during the past six years have given a very complete history of the infestation on sixty or more sample plots throughout the project area and the influence of control work on such plots as have been treated during the course of the work. The data are now complete as to the effect of control and the various factors which have influenced results. These will be summarized in a final study of this project, which will probably be completed next winter.

In addition, a study is very desirable of the area to determine the progress of the infestation and its relation to weather, drought, tree competition, fires and otherffactors, and can be very profitably carried on by using the sample plots which have been laid out and for which an immense amount of data have already been secured. It is hoped that the continuation of this work can be adequately financed, as it is very apt to yield information of immense value, which can be applied in directing artificial control operations of the future.

TABLE 1

Fall Survey of 1925
Summary of Cruising Data on Check Sections

Area	Unit	Location T	R	Sec.	Acres	Date of Cruise 1925	1924 H.S.	1924 H.W.	1925 I.S.	1925 I.W.	Total 1925 Loss Marked	Total 1925 Loss Estimated per Sec.	Remarks
I	Aspen Lake	37S	7E	34	80	Nov. 1	3	10	9	6	15	150	Untreated
	Clover Station	38S	6E	36	80	Nov. 2	9	20	38	68	106	1060	"
	Jenny Creek	40S	4E	34	80	Oct.30	32	14	37	19	56	560	"
	Johnson Prairie	39S	5E	7	80	Oct.28	0	26	13	20	33	330	"
	Topsy	40S	7E	33	80	Oct.31	4	4	16	13	29	290	"
II	Bly	37S	13E	6	80	Nov. 5	9	14	18	16	34	340	"
	Fergusen	35S	13E	33	80	Nov. 5	15	17	35	39	74	740	"
	Saddle Mountain	35S	8E	22	80	Nov. 3	8	16	21	42	63	630	"
	Sycan	34S	12E	2	320	Nov. 6	27	78	114	104	218	545	Treated 1924
	Sycan	34S	12E	28&33	80	Nov. 7	18	33	77	74	151	1510	Untreated
	Trout Creek	36S	9E	25	80	Nov. 4	4	28	34	52	86	860	"
	Whiskey Creek	37S	12E	17	40	Nov. 4	4	7	21	13	34	340	"
III	Deming Creek	36S	15E	8	320	Nov. 8	36	109	27	36	63	160	Treated 1924
	Deming Creek	36S	15E	25	160	Nov.10	12	34	45	26	71	355	Untreated

Total on untreated sections - 118 223 364 388 Increase in 1925 loss was 120%
" treated " - 63 187 141 140 " 1925 " 12%

TABLE 2

Survey of 1926

Summary of Cruising Data on Check Sections
Area #2

Unit	Location T	R	Sec.	Acres	Date of Cruise 1926	1924 H Loss Total Marked	1925 I.S.	1925 I.W.	Total Trees Marked	Total Estimate	Remarks
Antelope[1]	36S	8E	28	640	5/10	101	108	159	267	300	Untreated
Black Hills	34S	12E	28	320	6/26	—	70	97	167	190	"
Garber[1]	38S	13E	24	640	5/18	154	221	233	454	500	"
Goodlowe[1]	39S	13E	5	640	5/17	55	65	89	154	170	"
Hildebrand	37S	11E	21&28	320	5/13	166	43	69	112	120	Fire in 1923
Boyston	38S	12E	10	640	4/15	113	90	97	187	210	Partly logged 1925
Swan Lake[1]	37S	9E	36	480	5/ 7	89	90	92	182	200	Untreated
Sycan[2]	34S	12E	2	640	6/24	298	282	303	585	650	Tr.1924 also defol. by Pandora
Willow Flat[1]	36S	14E	31	640	5/20	138	213	177	390	430	Untreated

	1924 Loss	1925 Loss	
[1]Total trees marked on 5 normal untreated sections -	537	1447	Increase in 1925 - 169%
[2]Total trees marked on 1 treated section - - - - - -	298	585	1925 - 96%

Survey of 1926
Summary of Cruising Data on Check Sections
Area #3

Unit	Location T	R	Sec.	Acres	Date of Cruise 1926	1925 I.S.	1925 I.W.	Total Trees Marked	Total Estimate	1924 H Loss Total MBM	Remarks
Crowder Flat[1]	47N	11E	18	640	5/28	168	180	348	380	71	Untreated
" 1	47N	12E	4	640	5/31	33	28	61	70	23	"
Deming Creek[2]	36S	15E	8	640	6/15	81	97	178	200	289	Treated 1924
" 1	36S	15E	25	640	6/12	149	124	273	300	145	Untreated
Horsefly	38S	14E	13	640	5/25	85	122	207	230	45	Fire in 1924
" 1	38S	14E	36	640	5/26	127	205	332	370	112	Untreated
Merritt Creek[1]	33S	14E	34	640	6/22	67	79	146	160	87	"
Meryl Creek[1]	35S	14E	11	640	6/17	196	271	467	520	161	"
" 1	35S	15E	20	640	6/19	149	265	414	460	111	"
Owens[1]	38S	15E	1	640	6/10	76	93	169	190	36	"
" 1	37S	16E	29	640	6/ 8	206	355	561	620	151	"
Quarts[1]	38S	17E	7E½	320	6/ 4	29	50	79	90	23	"
" 1	38S	17E	8W½	320	6/ 3	44	48	92	100	41	"
Whitworth[1]	37S	16E	17	640	6/ 5	363	382	745	820	321	"

	1924 Loss	1925 Loss	
[1]Total trees marked on 12 untreated sections -	1282	3687	Increase in 1925 - 188%
[2]Total trees marked on 1 treated section	289	178	Decrease in 1925 - 62%

TABLE 4

Summary of Yellow Pine Losses for 1925
Area #1

Unit	No. of Trees Killed	Av. Volume per Tree	Volume Killed	Stumpage Value	Value of Loss	Per cent of Stand Killed	Loss per Acre Bd. Ft.	Av. Number Trees Killed Per Sec.
Aspen Lake[1,2]	4,500	900	4,050,000	$6.00	$24,300	1.48	239	170
Big Bend[2,3]	1,500	1000	1,500,000	6.00	9,000	2.18	205	131
Chase Butte[2]	2,200	1000	2,200,000	5.00	11,000	1.71	191	122
Clover Sta.[2,4,5]	14,000	900	12,600,000	6.00	75,600	1.81	243	173
Eagle Ridge[1]	4,000	900	3,600,000	7.00	25,200	1.85	201	143
Jenny Creek[2]	7,800	900	7,020,000	5.00	35,100	1.87	154	109
Johnson Prairie	9,100	1200	10,920,000	5.00	54,600	1.80	227	121
Klamath Canyon[3]	4,000	600	2,400,000	3.00	7,200	4.04	214	227
Pokegama[2]	16,000	900	14,400,000	5.00	72,000	1.83	292	209
Round Lake[1,2]	6,600	1000	6,600,000	6.00	39,600	2.91	360	230
Topsy[3]	5,900	1000	5,900,000	6.00	35,400	2.34	232	152
Worden[3]	2,400	1000	2,400,000	5.00	12,000	3.76	320	205
Totals	78,000	940	78,590,000	5.45	401,000	1.97	237	160

1 Units on which 1921 loss was treated
2 " 1922 " "
3 " 1923 "
4 " 1924 "
5 " 1925 "

TABLE 5

Summary of Yellow Pine Losses for 1925
Area #2

Unit	No. of Trees Killed	Av. Volume per Tree	Volume Killed	Stumpage Value	Value of Loss	Per Cent of Stand Killed	Loss per Acre Bd. Ft.	Av. Number Trees Killed per Sec.
Algoma[1]	1,400	900	1,260,000	$5.00	$6,300	2.90	147	104
Antelope[2]	4,800	900	4,320,000	5.00	21,600	1.33	173	123
Black Hills[3]	12,000	1000	12,000,000	4.00	48,000	2.26	322	206
Bly	8,700	1000	8,700,000	4.50	39,150	3.30	311	200
Chiloquin[2]	1,300	900	1,170,000	5.00	5,850	.53	54	38
Ferguson[3]	5,000	900	4,500,000	4.00	18,000	4.03	397	282
Gerber	1,400	900	1,260,000	3.50	4,410	4.15	221	157
Goodlowe	3,200	900	2,880,000	3.50	10,080	3.82	234	167
Hildebrand[3]	3,400	800	2,720,000	5.00	13,600	1.59	160	127
Rock Canyon[3]	4,300	1000	4,300,000	4.50	19,350	2.78	353	226
Royston[3]	3,300	800	2,640,000	4.00	10,560	1.54	217	174
Saddle Mt.[2]	9,000	900	8,100,000	5.00	40,500	2.04	206	146
Shoner[1]	1,400	700	980,000	5.00	4,900	.93	80	72
Sprague[2]	1,600	900	1,440,000	6.00	8,640	2.36	268	190
Squaw Flat[3]	2,700	1000	2,700,000	5.00	13,500	1.55	172	110
Swan[1]	2,800	900	2,520,000	5.00	12,600	1.75	172	122
Sycan[4]	12,000	800	9,600,000	3.50	33,600	1.71	239	192
Trout Creek[2]	8,000	900	7,200,000	5.00	36,000	2.01	210	149
Whiskey Creek[3]	7,200	900	6,480,000	4.50	29,160	2.09	258	184
WillowFlat[3]	12,000	900	10,800,000	4.50	48,600	2.79	330	235
Yainax[3]	4,500	900	4,050,000	5.00	20,250	2.14	258	183
Totals	110,000	905	99,620,000	4.45	444,650	2.08	234	165

[1] Units on which 1921 loss was treated
[2] " 1922 "
[3] " 1923 "
[4] " 1924 "

Pumice 35,300

Summary of Yellow Pine Losses for 1925
Area #3

Unit	No. of Trees Killed	Av. Volume per Tree	Volume Killed	Stumpage Value	Value of Loss	Per Cent of Stand Killed	Loss per Acre Bd. Ft.	Av. Number Trees Killed per Sec.
Barnes Valley	5,400	900	4,860,000	$3.00	$14,580	1.44	112	80
Crowder Flat[2,3]	13,000	1000	13,000,000	3.50	45,500	1.48	143	91
Deming Crk.[2,4]	5,400	900	4,860,000	4.50	21,870	2.05	146	104
Dog Lake	4,000	1000	4,000,000	3.00	12,000	1.04	75	48
Four Mile	2,700	1000	2,700,000	3.00	8,100	.88	70	45
Hay Creek	2,000	900	1,800,000	3.00	5,400	.98	94	67
Horsefly[1,2,3]	10,000	900	9,000,000	4.50	40,500	3.03	323	139
Merritt Creek	2,900	900	2,610,000	3.50	9,130	1.81	120	85
Meryl Creek[2]	17,200	900	15,480,000	4.50	69,660	3.02	244	174
Owens[1,3]	8,000	1000	8,000,000	4.50	36,000	2.45	209	134
Quartz Valley[3]	3,200	1000	3,200,000	4.00	12,800	1.08	95	61
Scab Rock	4,000	900	3,600,000	3.00	10,800	2.44	183	131
Whitworth Cr.[2]	8,200	800	6,560,000	4.50	29,520	3.60	193	154
Totals	86,000	926	79,670,000	3.96	315,860	1.88	150	104

[1] Units on which 1921 loss was treated
[2] " 1922 "
[3] " 1923 "
[4] " 1924 "

TABLE 7

PROJECT TOTALS

Summary of Yellow Pine Losses for 1925

Items	Area 1	Area 2	Area 3	Totals
Number of trees killed	78,000	110,000	86,000	274,000
Average volume per tree	940	905	926	922
Volume killed	73,590,000	99,620,000	79,670,000	252,880,000
Average value per M.B.M.	$5.45	$4.45	$3.96	$4.60
Value of stumpage lost	$401,000	$444,650	$315,860	$1,161,510
Per cent of stand killed	1.97%	2.08%	1.88%	1.98%
Loss in board feet per acre	237	234	150	200
Average no. trees killed per sec.	160	165	104	138